A Guide to Filing a Utility Patent Application

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A Guide to Filing a Utility Patent Application

Introduction

The United States Patent and Trademark Office (USPTO or Office) is the government agency responsible for examining patent applications and issuing patents. A patent is a type of property right. It gives the patent holder the right, for a limited time, to exclude others from making, using, offering to sell, selling, or importing into the United States the subject matter that is within the scope of protection granted by the patent. The USPTO determines whether a patent should be granted in a particular case. However, it is up to the patent holder to enforce his or her own rights if the USPTO does grant a patent.

The purpose of this guide is to provide you with basic information about filing a utility patent application. A patent application is a complex legal document, best prepared by one trained to prepare such documents. Thus, after reviewing this guide, you may wish to consult with a registered patent attorney or agent. Additional information is available:

- by calling the USPTO's Contact Center at 800-PTO-9199 (800-786-9199) or 571-272-1000,
- from the USPTO's web site at www.uspto.gov, and
- at your nearest Patent and Trademark Depository Library (PTDL).
  You will find information on PTDLs at the end of this guide.

There are three types of patents - utility, design, and plant and there are two types of utility and plant patent applications - provisional and nonprovisional. A provisional application is a quick and inexpensive way for inventors to establish a U.S. filing date for their invention which can be claimed in a later filed nonprovisional application. A provisional application is automatically abandoned twelve months after its filing date and is not examined. A nonprovisional application is examined by a patent examiner, and may be issued as a patent if all the requirements for patentability are met. Each year the USPTO receives approximately 400,000 patent applications. Most of the applications filed with the USPTO are for nonprovisional utility patents.

This guide contains information to assist you in filing your nonprovisional utility patent application. It specifies the required parts of the utility patent application and identifies some of the forms you may use (which are available on the USPTO's web site at www.uspto.gov). This information is generally derived from patent laws and regulations found at Title 35 of the United States Code (U.S.C.), and Title 37 of the Code of Federal Regulations (CFR). These materials, as well as the *Manual of Patent Examining Procedure* (MPEP), are available at the USPTO's web site at www.uspto.gov, at PTDLs, and at most law libraries.

Please contact USPTO's Contact Center, the USPTO's web site, or a PTDL if you have questions about:

- other types of patent applications,
- locating a patent attorney or agent,
- obtaining the most up-to-date Fee Schedule, or
- obtaining copies of other USPTO publications.

Nonprovisional Utility Patent

Filing Options

A nonprovisional utility patent application can be filed with the USPTO through the Office's electronic filing system called EFS-Web, delivery by U. S. mail, or hand delivery to the Office in Alexandria, Virginia. EFS-Web is a web-based patent application and document submission system in which anyone with a web-enabled computer can file patent applications and documents without downloading special software or changing document preparation tools and processes. Full technical support for EFS-Web is available through the Patent Electronic Business Center (EBC) at 866-217-9197 from 6 a.m. to 12 midnight Eastern Standard Time (EST), Monday through Friday, except Federal holidays. For more information on EFS-Web, see the USPTO website at www.uspto.gov.

Application Requirements

A nonprovisional utility patent application must be in the English language or be accompanied by a translation in the English language, a statement that the translation is accurate and a fee set forth in 37 CFR §1.17(i). If an applicant files a non-provisional utility application in a language other than English without a translation or statement, the Applicant will be given a notice and time period for submitting a translation of the application and a statement that the translation is accurate.

All papers which will become part of the permanent records of the USPTO must be typewritten or produced by a mechanical (or computer) printer. The text must be in permanent black ink or its equivalent; on a single side of the paper; in portrait orientation; on white paper that is all of the same size, flexible, strong, smooth, nonshiny, durable, and without holes. All text matter should be in at least 12 point font and each letter must be clear and distinct. The paper size must be either:

- 21.6 cm. by 27.9 cm. (8 1/2 by 11 inches), or
- 21.0 cm. by 29.7 cm. (DIN size A4).

There must be a left margin of at least 2.5 cm. (1 inch) and top, right, and bottom margins of at least 2.0 cm. (3/4 inch). Drawing page requirements are discussed separately below.

A nonprovisional utility patent application must include a specification, including a claim or claims; drawings, when necessary; an oath or declaration; and the prescribed filing, search, and examination fees. A complete nonprovisional utility patent application should contain the elements listed below, arranged in the order shown. Description of these elements are provided in the following sections:

- Utility Patent Application Transmittal Form or Transmittal Letter,
- Fee Transmittal Form and Appropriate Fees,
- Application Data Sheet (see 37 CFR §1.76),
- Specification (with at least one claim),
- Drawings (when necessary),
- Executed Oath or Declaration,
- Nucleotide and/or Amino Acid Sequence Listing (when necessary), and
- Large Tables or Computer Listings (when necessary).

Utility Patent Application Transmittal Form or Transmittal Letter

A Utility Patent Application Transmittal Form (Form PTO/SB/05) or a transmittal letter should be filed with every patent application to identify the items being filed (e.g., specification, claims, drawings, declaration, information disclosure statement). The form identifies the applicant(s), the type of application, the title of the invention, the contents of the application, and any accompanying enclosures. (Form PTO/SB/21 should be used for all correspondence after initial filing.)

Fee Transmittal Form and Appropriate Fees

The Fee Transmittal Form (Form PTO/SB/17) may be used to calculate the prescribed filing, examination, and search fees, any excess claim fees or application size fee, and indicate the method of payment (by check, money order, deposit account, or credit card). The amount is dependent on the number of sheets of paper in the specification and drawings, the number and type of claims presented, and whether or not a written assertion of small entity status is provided.

The filing, search, and examination fees for a patent application should be submitted with the application and must be made payable to the "Director of the United States Patent and Trademark Office" if paid by check or money order. If an application is filed without the fees, the applicant will be notified and required to submit the fees within the time period set in the notice. If the basic filing fee was not paid at the time of filing the application or an executed oath or declaration was not included, a surcharge is also required for late acceptance of the basic filing fee or the oath or declaration. Fees are subject to change and the applicant should consult the current Fee Schedule before filing.

Please note that two sets of fees exist, one for small entities and one for other than small entities. If you qualify as a small entity for patent fee purposes, no special form is required to claim your entitlement to reduced fees (you may check a special box on the transmittal form), but you should only pay small entity rates after ensuring that you qualify for the small entity status. For example, if the inventors have not assigned any rights in the invention set forth in the application and are not under any obligation to do so (as may be required in an employment contract), small entity status may be appropriate. See 37 CFR §1.27 and MPEP §509.02 for more information.

Application Data Sheet

The application data sheet or sheets are voluntarily submitted in either provisional or nonprovisional applications with bibliographic data arranged in a format specified by the USPTO. Specific bibliographic data includes applicant information, correspondence information, application information, representative information, domestic priority information, foreign priority information and assignment information. See 37 CFR §1.76 and MPEP §601.05 for more information.

Supplemental application data sheets may be subsequently provided prior to payment of the issue fee to either correct or update information in a previously submitted application data sheet, or an oath or declaration under title 37 CFR §1.63 or 1.67. However, certain information cannot be changed by simply filing a supplemental application data sheet. For example, changes to the named inventors must comply with the requirements of 37 CFR §1.48, correspondence address changes must comply with the requirements of 37 CFR §1.33(a), and changes to an inventor's citizenship must comply with the requirements of 37 CFR §1.63 or 1.67. Supplemental application data sheets must be titled "Supplemental Application Data Sheet," include all of the section headings listed in 37 CFR 1.76(b) and all appropriate data for each section heading, and must identify the information that is being changed, preferably with underlining for insertions, and strike-through or brackets for text removed.

Specification

The specification is a written description of the invention and of the manner and process of making and using the invention that concludes with the claims to the invention, which must begin on a new page. The specification must be in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which the invention pertains to make and use the same.

Computer program listings may be submitted as part of the specification as set forth in 37 CFR 1.96(b) and (c). Other than in a reissue application or reexamination proceeding, the pages of the specification (but not the transmittal letter sheets or other forms), including claims and abstract, must be numbered consecutively, starting with 1, the numbers being centrally located above or preferably below, the text. The lines of the specification must be 1.5 or double spaced (lines of text not comprising the specification need not be 1.5 or double spaced). It is desirable to include an indentation at the beginning of each new paragraph, and for paragraphs to be numbered (i.e., [0001], [0002], [0003], etc.).

It is preferable to use all of the section headings described below to represent the parts of the specification. Section headings should use upper case text without underlining or bold type. If the section contains no text, the phrase "Not Applicable" should follow the section heading.

Title of Invention

The title of the invention (or an introductory portion stating the name, citizenship, residence of each applicant, and the title of the invention) should appear as the heading on the first page of the specification. Although a title may have up to 500 characters, the title must be as short and specific as possible.

Cross-Reference to Related Applications

Any nonprovisional utility patent application claiming the benefit of one or more prior filed copending nonprovisional applications (or international applications designating the United States of America) under 35 USC §§120, 121 or 365(c), or to a provisional patent application under 35 USC §119(e) must contain in the first sentence(s) of the specification following the title, a reference to each such prior application, identifying it by the application number or international application number and international filing date, and indicating the relationship of the applications, or include the reference to the earlier application in an application data sheet under 37 CFR §1.76. See 37 CFR 1.78. Cross-references to other related patent applications may be made when appropriate.

Statement Regarding Federally Sponsored Research or Development

The application should contain a statement as to rights to inventions made under federally sponsored research and development (if any). See MPEP §310 for more information.

Reference to Sequence Listing, a Table, or a Computer Program Listing Compact Disc Appendix

Any material submitted separately on a compact disc must be referenced in the specification. The only material accepted on compact disc are computer program listings, gene sequence listings, and tables of information. All such information submitted on compact disc must be in compliance with 37 CFR §1.52(e), and the specification must contain a reference to the compact disc and its contents. The contents of compact disc files must be in standard ASCII character and file formats. The total number of compact discs including duplicates and the files on each compact disc must be specified in the specification.

If a computer program listing is submitted and is over 300 lines long (each line of up to 72 characters), the computer program listing must be submitted on a compact disc in compliance with 37 CFR §1.96, and the specification must contain a reference to the computer program listing appendix. A computer program listing of 300 or less lines may be, but is not required to be, submitted on compact disc. The computer program listing on compact disc will not be printed with any patent or patent application publication.

If a gene sequence listing is to be submitted, the sequence may be provided on a compact disc in compliance with 37 CFR §§1.821-1.825, in lieu of submission on paper, and the specification must contain a reference to the gene sequence listing on compact disc.

If a table of data is submitted, and the table would occupy more than 50 pages if submitted on paper, the table can be submitted on a compact disc in compliance with 37 CFR §1.58, and the specification must contain a reference to the table on compact disc. The data in the table must properly align visually with the associated rows and columns.

Background of the Invention

This section should include a statement of the field of endeavor to which the invention pertains. This section may also include a paraphrasing of the applicable U.S. patent classification definitions or the subject matter of the claimed invention.

This section should also contain a description of information known to you, including references to specific documents, which are related to your invention. It should contain, if applicable, references to specific problems involved in the prior art (or state of technology) which your invention is drawn toward. See MPEP 608.01(c) for more information.

Brief Summary of the Invention

This section should present the substance or general idea of the claimed invention in summarized form. The summary may point out the advantages of the invention and how it solves previously existing problems, preferably those problems identified in the **Background of the Invention** section. A statement of the object of the invention may also be included. See MPEP 608.01(d) for more information.

Brief Description of the Several Views of the Drawing

Where there are drawings, you must include a listing of all figures by number (e.g., Figure 1A) and with corresponding statements explaining what each figure depicts.

Detailed Description of the Invention

In this section, the invention must be explained along with the process of making and using the invention in full, clear, concise, and exact terms. This section should distinguish the invention from other inventions and from what is old and describe completely the process, machine, manufacture, composition of matter, or improvement invented. In the case of an improvement, the description should be confined to the specific improvement and to the parts that necessarily cooperate with it or which are necessary to completely understand the invention.

It is required that the description be sufficient so that any person of ordinary skill in the pertinent art, science, or area could make and use the invention without extensive experimentation. The best mode contemplated by the inventor of carrying out the invention must be set forth in the description. Each element in the drawings should be mentioned in the description. In the past, this section was entitled "Description of the Preferred Embodiment." See MPEP 608.01(g) for more information.

Claim or Claims

The claim or claims must particularly point out and distinctly claim the subject matter which the inventor or inventors regard as the invention. The claims define the scope of the protection of the patent. Whether a patent will be granted is determined, in large measure, by the scope of the claims.

A nonprovisional application for a utility patent must contain at least one claim. The claim or claims section must begin on a separate physical sheet or electronic page. If there are several claims, they shall be numbered consecutively in Arabic numerals.

One or more claims may be presented in dependent form, referring back to and further limiting another claim or claims in the same application. All dependent claims should be grouped together with the claim or claims to which they refer to the extent practicable. Any dependent claim that refers to more than one other claim ("a multiple dependent claim") shall refer to such other claims in the alternative only. Each claim should be a single sentence, and where a claim sets forth a number of elements or steps, each element or step of the claim should be separated by a line indentation.

The fee required to be submitted with a nonprovisional utility patent application is, in part, determined by the number of claims, independent claims, and total claims.

Abstract of the Disclosure

The purpose of the abstract is to enable the USPTO and the public to determine quickly the nature of the technical disclosures of your invention. The abstract points out what is new in the art to which your invention pertains. It should be in narrative form and generally limited to a single paragraph, and it must begin on a separate page. An abstract should not be longer than 150 words. See MPEP 608.01(b) for more information.

Drawings (when necessary)

A patent application is required to contain drawings, if drawings are necessary to understand the subject matter to be patented. The drawings must show every feature of the invention as specified in the claims. Omission of drawings may cause an application to be considered incomplete. Please see the detailed **Drawing Requirements** section.

Oath Or Declaration

Forms PTO/SB/01, PTO/SB/01A, PTO/SB/02, PTO/SB/02LR, PTO/SB/03, PTO/SB/03a, PTO/SB/04, PTO/SB/51, and PTO/SB/51S are made available by the Office for an applicant's use. Oaths or declarations are required for applications involving designs, plants, and utility inventions and for reissue applications, with PTO/SB/03 and PTO/SB/03a for plant applications and PTO/SB/51 and PTO/SB/51s for reissue applications. Each inventor must make an oath or declaration that he/she believes himself/herself to be the original and first inventor of the subject matter of the application, and he/she must make various other statements required by law and various statements required by the USPTO rules. If an application data sheet is filed, the USPTO rules require fewer statements in the oath or declaration. See Title 37, Code of Federal Regulations, Sections 1.63 and 1.76. The oath must be sworn to by the inventor before a notary public or other officer authorized to administer oaths. A declaration may be used in lieu of an oath. A declaration does not require any witness or person to administer or verify its signing. Thus, use of a declaration is preferable. When filing a continuation or divisional application, a copy of an earlier-filed oath or declaration from the parent application may be acceptable. The oath or declaration must be signed by the inventor in person, or by the person entitled by law to make application on the inventor's behalf. A full first and last name with middle initial or name, if any, and the citizenship of each inventor are required. The mailing address of each inventor and foreign priority information (if any) is also required if an application data sheet is not used.

Any oath or declaration must be in a language the inventor understands. If the oath or declaration used is in a language other than English, and is not in a form provided by the United States Patent and Trademark Office or provided in accordance with Patent Cooperation Treaty (PCT) Rule 4.17(iv), an English translation together with a statement that the translation is accurate is required. The USPTO provides forms PTO/SB/101-110, which are declaration forms in certain foreign languages with an English translation, for an applicant's use.

If the person making the oath or declaration is not the inventor, the oath or declaration shall state the relationship of that person to the inventor, upon information and belief, the facts which the inventor

would have been required to state, and the circumstances which render the inventor unable to sign, namely death, insanity or legal incapacity or unavailability/refusal to sign. (See 37 CFR §§1.42, 1.43, and 1.47.) If the inventor has refused or cannot be reached to sign the declaration, then a petition under 37 CFR §1.47 is required, and if there are inventors who have signed the oath or declaration, then the remaining inventors must sign the oath or declaration on behalf of the non-signing inventor. If the sole or all of the inventors has not signed the oath or declaration, then the oath or declaration must be signed by the party showing proprietary interest in the application, as shown in the petition under 37 CFR §1.47(b). If the inventor has died or is legally incapacitated, then the legal representative of the deceased or incapacitated inventor must sign the oath or declaration on behalf of the inventor.

Sequence Listing (when necessary)

This section, for the disclosure of a nucleotide and/or amino acid sequence, should contain a listing of the sequence complying with 37 CFR §1.821 through 37 CFR §1.825 and may be in paper or electronic form.

Obtaining a Receipt for Documents Mailed to the USPTO

A receipt for documents mailed or hand delivered to the USPTO can be obtained by attaching a stamped, self-addressed postcard to the first page of the documents. The postcard should contain a detailed list that identifies each type of document and the number of pages of each document. Upon receipt at the USPTO, the detailed list on the postcard will be compared to the actual contents of the delivery. Any discrepancies between the detailed list and the actual contents will be noted on the postcard. The postcard will be initialed and date stamped by the person who reviewed the application in the Office of Initial Patent Examination. The postcard will be returned by mail to the addressee whose name appears on the postcard.

The returned postcard serves as evidence of receipt in the USPTO of all items listed on the postcard, unless otherwise noted by the USPTO on the postcard. That is, if the postcard receipt has been annotated to indicate that a particular paper was not received, the postcard receipt will not serve as evidence of receipt of that paper in the USPTO. Likewise, the postcard receipt will not serve as evidence of receipt of papers which are not adequately itemized.

When preparing the detailed list of documents identified on the postcard, it is important to include the following identifying information:

- the application number (if known),
- the confirmation number (if known),
- the filing date of the application (if known),
- the title of the invention, and
- the name of the inventor or inventors.

The postcard should also include a detailed list of every document type and the number of pages of each document that are included in the delivery. If the postcard is submitted with a patent application, the detailed listing should include the following items:

- the title and number of pages of each USPTO form,
- the number of pages of specification (excluding claims),
- the number of claims and the number of claim pages,
- the number of figures of drawing and the number of sheets of drawings,
- whether an oath or declaration statement is included and the number of pages,
- the type and number of other documents that are included and the number of pages of each document, and
- the amount of payment and the method of payment (i.e., check, credit card, money order, or deposit account).

It is important that the postcard itemizes each component of the application. For example, a general statement such as "complete application" or "patent application" or "drawings" will not show that each of the required components of an application was included if one of the items is later found to be missing by the USPTO.

When the self-addressed postcard is submitted with a utility patent application, the USPTO will stamp the postcard being returned to the addressee with both the receipt date and the application number before placing it in the outgoing mail.

Upon receipt of the returned postcard, the addressee should promptly review the postcard to ensure that all documents and all pages were received by the USPTO.

Pursuant to 35 U.S.C. 21 and 37 CFR §1.10, any correspondence received by the USPTO (including an application filing) that was delivered by the "Express Mail Post Office to Addressee" service of the United States Postal Service (USPS) will be considered filed in the Office on the date of deposit with the USPS. The date of deposit with the USPS is shown by the "date-in" on the "Express Mail" mailing label or other official USPS notation. If the USPS deposit date cannot be determined, however, the correspondence will be accorded the Office receipt date as the filing date. Before depositing an application with the USPS in accordance with the "Express Mail" procedure set forth at 37 CFR §1.10, it is important to place the number of the "Express Mail" mailing label on the application papers. Further, only one application should be mailed in a single "Express Mail" package.

Drawing Requirements

Information on drawing requirements is based substantially on 37 CFR §1.84. There are two acceptable categories for presenting drawings in utility patent applications: black ink (black and white) and color.

Black and white drawings are normally required. India ink, or its equivalent that secures black solid lines, must be used for drawings. Drawings made by computer printer should be originals, not photocopies.

On rare occasions, color drawings may be necessary as the only practical medium by which the subject matter sought to be patented in a utility patent application is disclosed. The USPTO will accept color drawings in utility patent applications and statutory invention registrations only after granting a petition explaining why the color drawings are necessary. Any such petition must include:

- the appropriate fee set forth in 37 CFR §1.17(h).
- three sets of color drawings, and
- the following language as the first paragraph in that portion of the specification relating to the **Brief Description of the Several Views of the Drawing**. If the language is not in the specification, an amendment to insert the language must accompany the petition.

> "The patent or application file contains at least one drawing executed in color. Copies of this patent or patent application publication with color drawing(s) will be provided by the Office upon request and payment of the necessary fee."

Photographs are not ordinarily permitted in utility patent applications. The USPTO will accept black and white photographs in utility patent applications in applications in which the invention is not capable of being illustrated in an ink drawing or where the invention is shown more clearly in a photograph. For example, photographs or photomicrographs of electrophoresis gels, blots (e.g., immunological, western, southern, and northern), autoradiographs, cell cultures (stained and unstained), histological tissue cross sections (stained and unstained), animals, plants, in vivo imaging, thin layer chromatography plates, crystalline structures, and ornamental effects continue to be acceptable. Only one set of black and white photographs is required. Furthermore, no petition or additional processing fee is required.

Photographs have the same sheet size requirements as other drawings. The photographs must be of sufficient quality so that all details in the drawing are reproducible in the printed patent or any patent application publication.

Color photographs will be accepted in utility patent applications if the conditions for accepting color drawings have been satisfied.

Identification of Drawings

Identifying indicia, if provided, should include the title of the invention, the inventor's name, the application number (if known), and docket number (if any). This information must be placed within the top margin of each sheet of drawings. The name and telephone number of a person to call if the USPTO is unable to match the drawings to the proper application may also be provided.

Graphic Forms in Drawings

Chemical or mathematical formulas, tables, computer program listings, and waveforms may be submitted as drawings and are subject to the same requirements as drawings. Each chemical or mathematical formula must be labeled as a separate figure, using brackets when necessary, to show that information is properly integrated. Each group of waveforms must be presented as a single figure, using a common vertical axis with time extending along the horizontal axis. Each individual waveform discussed in the specification

must be identified with a separate letter designation adjacent to the vertical axis. These may be placed in a landscape orientation if they cannot be presented satisfactorily in a portrait orientation. Typewritten characters used in such formulas and tables must meet the requirements set forth in 37 CFR §1.58(c).

Paper

Drawings submitted to the USPTO must be made on paper which is flexible, strong, white, smooth, nonshiny, and durable. All sheets must be free from cracks, creases, and folds. Only one side of the sheet shall be used for the drawing. Each sheet must be reasonably free from erasures and must be free from alterations, overwritings, and interlineations.

All drawings sheets, including sheets containing photographs, in an application must be the same size. One of the shorter sides of the sheet is regarded as its top. The size of the sheets on which drawings are made must be:

- 21.6 cm. by 27.9 cm. (8 1/2 by 11 inches), or
- 21.0 cm. by 29.7 cm. (DIN size A4).

The sheets must not contain frames around the sight (the usable surface), but should have scan target points (cross hairs) printed on two cater-corner margin corners. The following margins are required:

- On 21.6 cm. by 27.9 cm. (8 1/2 by 11 inch) drawing sheets, each sheet must include a top margin of at least 2.5 cm. (1 inch), a left side margin of at least 2.5 cm. (1 inch), a right side margin of at least 1.5 cm. (5/8 inch), and a bottom margin of at least 1.0 cm. (3/8 inch) from the edges, thereby leaving a sight no greater than 17.6 cm. by 24.4 cm. (6 15/16 by 9 5/8 inches).
- On 21.0 cm. by 29.7 cm. (DIN size A4) drawing sheets, each sheet must include a top margin of at least 2.5 cm. (1 inch), a left side margin of at least 2.5 cm. (1 inch), a right side margin of at least 1.5 cm (5/8 inch), and a bottom margin of at least 1.0 cm. (3/8 inch) from the edges, thereby leaving a sight no greater than 17.0 cm. by 26.2 cm.

Views

The drawing must contain as many views as necessary to show the invention. The views may be plan, elevation, section, or perspective views. Detailed views of portions of elements, on a larger scale if necessary, may also be used. All views of the drawing must be grouped together and arranged on the sheet(s) without wasting space, preferably in an upright position, clearly separated from one another, and must not be included in the sheets containing the specifications, claims, or abstract. Views must not be connected by projection lines and must not contain center lines. Waveforms of electrical signals may be connected by dashed lines to show the relative timing of the waveforms.

Exploded Views

Exploded views, with the separated parts embraced by a bracket, to show the relationship or order of assembly of various parts are permissible. When an exploded view is shown in a figure which is on the same sheet as another figure, the exploded view should be placed in brackets.

Partial Views

When necessary, a view of a large machine or device in its entirety may be broken into partial views on a single sheet, or extended over several sheets if there is no loss in facility of understanding the view. Partial views drawn on separate sheets must always be capable of being linked edge to edge so that no partial view contains parts of another partial view. A smaller scale view should be included showing the whole formed by the partial views and indicating the positions of the parts shown. When a portion of a view is enlarged for magnification purposes, the view and the enlarged view must each be labeled as separate views.

Where views on two or more sheets form, in effect, a single complete view, the views on the several sheets must be so arranged that the complete figure can be assembled without concealing any part of any of the views appearing on the various sheets.

A very long view may be divided into several parts placed one above the other on a single sheet. However, the relationship between the different parts must be clear and unambiguous.

Sectional Views

The plane upon which a sectional view is taken should be indicated by a broken line on the view from which the section is cut. The ends of the broken line should be designated by Arabic or Roman numerals corresponding to the view number of the sectional view, and should have arrows to indicate the direction of sight. Hatching must be used to indicate section portions of an object, and must be made by regularly spaced oblique parallel lines spaced sufficiently apart to enable the lines to be distinguished without difficulty. Hatching should not impede the clear reading of the reference characters and lead lines. If it is not possible to place reference characters outside the hatched area, the hatching may be broken off wherever reference characters are inserted. Hatching must be at a substantial angle to the surrounding axes or principal lines, preferably 45°.

A cross section must be set out and drawn to show all of the materials as they are shown in the view from which the cross section was taken. The parts in cross section must show proper material(s) by hatching with regularly spaced parallel oblique strokes; the space between strokes being chosen on the basis of the total area to be hatched. The various parts of a cross section of the same item should be hatched in the same manner and should accurately and graphically indicate the nature of the material(s) illustrated in cross section.

The hatching of juxtaposed different elements must be angled in a different way. In the case of large areas, hatching may be confined to an edging drawn around the entire inside of the outline of the area to be hatched. Different types of hatching should have different conventional meanings as regards the nature of a material seen in cross section.

Alternate Position

A moved position may be shown by a broken line superimposed upon a suitable view if this can be done without crowding; otherwise, a separate view must be used for this purpose.

Modified Forms

Modified forms of construction must be shown in separate views.

Arrangement of Views

One view must not be placed upon another or within the outline of another. All views on the same sheet should stand in the same direction and, if possible, stand so that they can be read with the sheet held in an upright position. If views wider than the width of the sheet are necessary for the clearest illustration of the invention, the sheet may be turned on its side so that the top of the sheet is on the right-hand side, with the appropriate top margin used as the heading space. Words must appear in a horizontal, left-to-right fashion when the page is either upright or turned so that the top becomes the right side, except for graphs utilizing standard scientific convention to denote the axis of abscissas
(of X) and the axis of ordinates (of Y).

Front Page View

One of the views should be suitable for inclusion on the front page of the patent application publication and patent as the illustration of the invention.

Scale

The scale to which a drawing is made must be large enough to show the mechanism without crowding when the drawing is reduced in size to two-thirds in reproduction. Indications such as "actual size" or "scale 1/2" are not permitted on the drawings since these lose their meaning with reproduction in a different format.

Character of Lines, Numbers, and Letters

All drawings must be made by a process which will give them satisfactory reproduction characteristics. Every line, number, and letter must be durable, clean, black (except for color drawings), sufficiently dense and dark, and uniformly thick and well-defined. The weight of all lines and letters must be heavy enough to permit adequate reproduction. This requirement applies to all lines however fine, to shading, and to lines representing cut surfaces in sectional views. Lines and strokes of different thicknesses may be used in the same drawing where different thicknesses have a different meaning.

Shading

The use of shading in views is encouraged if it aids in understanding the invention and if it does not reduce legibility. Shading is used to indicate the surface or shape of spherical, cylindrical, and conical elements of an object. Flat parts may also be lightly shaded. Such shading is preferred in the case of parts shown in perspective, but not for cross sections. See discussion of sectional views above. Spaced lines for shading are preferred. These lines must be thin, as few in number as practicable, and they must contrast with the rest of the drawings. As a substitute for shading, heavy lines on the shade side of objects can be used except where they superimpose on each other or obscure reference characters. Light should come from the upper left corner at an angle of 45°. Surface delineations should preferably be shown by proper shading. Solid black shading areas are not permitted, except when used to represent bar graphs or color.

Symbols

Graphical drawing symbols may be used for conventional elements when appropriate. The elements for which such symbols and labeled representations are used must be adequately identified in the specification. Known devices should be illustrated by symbols which have a universally recognized conventional meaning and are generally accepted in the art. Other symbols which are not universally recognized may be used, subject to approval by the USPTO, if they are not likely to be confused with existing conventional symbols, and if they are readily identifiable.

Legends

Suitable descriptive legends may be used, or may be required by the examiner, where necessary for understanding of the drawing, subject to approval by the USPTO. They should contain as few words as possible.

Numbers, Letters, and Reference Characters

The English alphabet must be used for letters, except where another alphabet is customarily used, such as the Greek alphabet to indicate angles, wavelengths, and mathematical formulas.

Reference characters (numerals are preferred), sheet numbers, and view numbers must be plain and legible, and must not be used in association with brackets or inverted commas, or enclosed within outlines (encircled). They must be oriented in the same direction as the view to avoid having to rotate the sheet. Reference characters should be arranged to follow the profile of the object depicted.

Numbers, letters, and reference characters must measure at least 0.32 cm. (1/8 inch) in height. They should not be placed in the drawing in a way that interferes with its comprehension. Therefore, they should not cross or mingle with the lines. They should not be placed upon hatched or shaded surfaces.

When necessary, to indicate a surface or cross section, a reference character may be underlined and a blank space may be left in the hatching or shading where the character occurs so that it appears distinct.

The same part of an invention appearing in more than one view of the drawing must always be designated by the same reference character, and the same reference character must never be used to designate different parts.

Reference characters not mentioned in the description shall not appear in the drawings. Reference characters mentioned in the description must appear in the drawings.

Lead Lines and Arrows

Lead lines are those lines between the reference characters and the details to which they refer. Such lines may be straight or curved and should be as short as possible. They must originate in the immediate proximity of the reference character and extend to the feature indicated. Lead lines must not cross each other. Lead lines are required for each reference character except for those which indicate the surface or cross section on which they are placed. Such a reference character must be underlined to make it clear that a lead line has not been left out by mistake. Lead lines must be executed in the same way as lines in the drawing.

Arrows may be used at the ends of lines as follows, provided that their meaning is clear::

- on a lead line, a freestanding arrow is used to indicate the entire section toward which it points,
- on a lead line, an arrow touching a line is used to indicate the surface shown by the line looking along the direction of the arrow, or
- to show the direction of movement.

Copyright or Mask Work Notice

A copyright or mask work notice may appear in the drawing, but it must be placed within the sight of the drawing immediately below the figure representing the copyright or mask work material and be limited to letters having a print size of 0.32 cm. to 0.64 cm. (1/8 to 1/4 inches) high. The content of the notice must be limited to only those elements provided for by law. For example, "©1983 John Doe" (17 U.S.C. 401) and "*M* John Doe" (17 U.S.C. 909) would be properly limited and, under current statutes, legally sufficient notices of copyright and mask work, respectively. Inclusion of a copyright or mask work notice will be permitted only if the authorization language set forth in 37 CFR §1.71(e) is included at the beginning (preferably as the first paragraph) of the specification.

Numbering of Sheets of Drawings and Views

The sheets of drawings should be numbered in consecutive Arabic numerals, starting with 1, within the sight (the usable surface). These numbers, if present, must be placed in the middle of the top of the sheet, but not in the margin. The numbers can be placed on the right-hand side if the drawing extends too close to the middle of the top edge of the usable surface. The drawing sheet numbering must be clear and larger than the numbers used as reference characters to avoid confusion. The number of each sheet should be shown by two Arabic numerals placed on either side of an oblique line, with the first being the sheet number and the second being the total number of sheets of drawings, with no other marking.

The different views must be numbered in consecutive Arabic numerals, starting with 1, independent of the numbering of the sheets and, if possible, in the order in which they appear on the drawing sheet(s). Partial views intended to form one complete view, on one or several sheets, must be identified by the same number followed by a capital letter. View numbers must be preceded by the abbreviation "FIG". Where only a single view is used in an application to illustrate the claimed invention, it must not be numbered and the abbreviation "FIG." must not appear.

Numbers and letters identifying the views must be simple and clear and must not be used in association with brackets, circles, or inverted commas. The view numbers must be larger than the numbers used for reference characters.

Security Markings

Authorized security markings may be placed on the drawings provided they are outside the sight, preferably centered in the top margin.

Corrections

Any corrections on drawings submitted to the USPTO must be durable and permanent.

Holes

No holes should be made by the applicant in the drawing sheets. Rather than use of a staple, a non-hole producing binder clip should be used.

Patent and Trademark Depository Library (PTDL) Program

The Patent and Trademark Depository Library Program is comprised of a network of Patent and Trademark Depository Libraries (PTDLs) located in the 50 states, the District of Columbia, and Puerto Rico which provide access to many of the same products and services offered at the USPTO search facilities in Alexandria, VA. The scope of PTDL collections, hours of operation, services, and fees (where applicable) vary depending on PTDL location. Users are advised to call ahead to determine products and services available at a particular PTDL. PTDLs also offer automated access to patent and trademark information. Please refer to the USPTO's web site for a complete list of PTDLs at www.uspto.gov/go/ptdl/.

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